

Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Quantification of the error induced on Langmuir probe determined electron temperature and density due to an RF plasma potential
NISCHAL KAFLE, DAVID DONOVAN, Univ of Tennessee, Knoxville, ELIJAH MARTIN, Oak Ridge National Laboratory — An RF plasma potential can significantly effect the IV characteristic of a Langmuir probe if not properly compensated. A substantial research effort in the low temperature plasma community has been carried out to determine this effect and how to achieve the required compensation for accurate measurements. However, quantification of the error induced on the extracted electron temperature and density from an uncompensated Langmuir probe due to an RF plasma potential has not been explored. The research presented is the first attempt to quantify this error in terms of RF plasma potential magnitude, electron temperature, and electron density. The Langmuir probe IV characteristic was simulated using empirical formulas fitted to the Laframboise simulation results. The RF effected IV characteristic was simulated by adding a sinusoidal variation to the plasma potential and computing the time average numerically. The error induced on the electron temperature and density was determined by fitting the RF effected IV characteristic to the empirical formulas representing the standard Laframboise simulation results. Experimental results indicating the accuracy of this quantification will be presented.

Nischal Kafle
Univ of Tennessee, Knoxville

Date submitted: 23 Jul 2015

Electronic form version 1.4